Small Business Innovation Research/Small Business Tech Transfer

Collaborative Trajectory Options Planning for the Flight Deck, Phase I

Completed Technology Project (2018 - 2019)

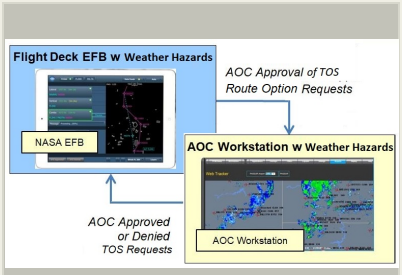
Project Introduction

We develop Flight Deck (FD) and Airline Operational Control (AOC) Decision Support Tools (DSTs) for strategic guidance to pilots for mitigating encounters with en route weather hazards. Implemented on either Commercial Off-The-Shelf (COTS) Electronic Flight Bags (EFBs) or Personal Electronic Devices (PEDs), the system is designed to increase the likelihood of Air Traffic Control (ATC) approval of a pilots' trajectory change request by strategically presenting multiple viable, pro-active trajectory change options to the pilot based on timely traffic and weather information. The information provided to the FD DST is coordinated with information provided to dispatchers working at AOC workstations for a shared situational awareness of the aviation weather hazard and a coordinated hazard mitigation strategy. Route options are formulated in the format of Trajectory Options Sets (TOSs), which facilitates quick approval by air traffic control automation.

Anticipated Benefits

We are working towards a solution that exploits the emerging EFBs and PEDs that are allowing for tactical weather avoidance maneuvering to be analyzed by the FD in 5 min to 20 min ahead of an en route flight. To this end, we make specific mention of the NASA Langley Class 2 EFB solution in their Traffic Aware Strategic Aircrew Requests (TASAR) Traffic Aware Planner (TAP) system, since it is an ideal platform to demonstrate these concepts.

The non-NASA applications include any airline that utilizes EFBs and PEDs to coordinate FD and AOC activities. Most major airlines are progressing in this direction. Our software will utilize current TOS data formats to allow the FD and AOCs to work in collaboration on route options.



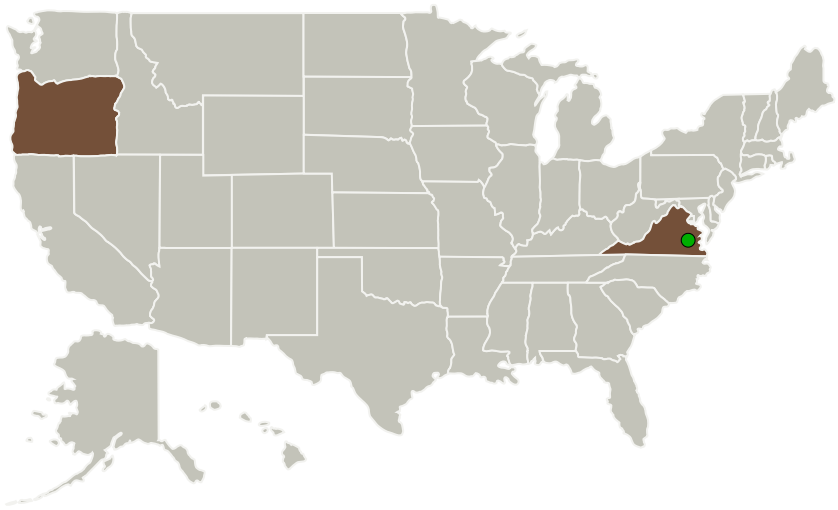
Collaborative Trajectory Options Planning for the Flight Deck, Phase I

Table of Contents

Collaborative Trajectory Options Planning for the Flight Deck, Phase I

Completed Technology Project (2018 - 2019)

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
The Innovation Laboratory, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Portland, Oregon
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Oregon	Virginia

Project Transitions

July 2018: Project Start

February 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/141307)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

The Innovation Laboratory, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

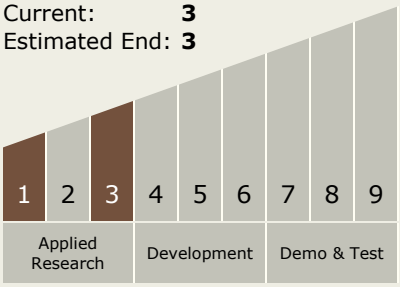
Carlos Torrez

Principal Investigator:

Jimmy Krozel

Technology Maturity (TRL)

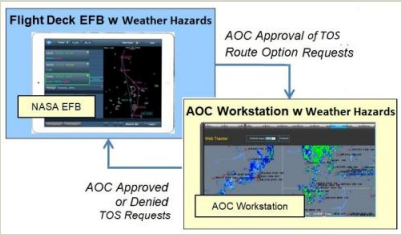
Start: **1**
Current: **3**
Estimated End: **3**



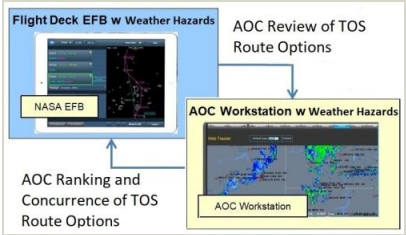
Collaborative Trajectory Options Planning for the Flight Deck, Phase I

Completed Technology Project (2018 - 2019)

Images



Briefing Chart Image
Collaborative Trajectory Options Planning for the Flight Deck, Phase I
(https://techport.nasa.gov/image/129277)



Final Summary Chart Image
Collaborative Trajectory Options Planning for the Flight Deck, Phase I
(https://techport.nasa.gov/image/136753)

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.3 Aero Propulsion
    - TX01.3.1 Integrated Systems and Ancillary Technologies

Target Destination

Earth